

Amendments to the Claims

The following listing of the claims replaces all previous listings and versions of the claims in the application:

5 Listing of the Claims:

1. (currently amended) A shell and tube reactor module for hydrogen production, comprising:

a reactor having a shell side, at least one palladium membrane tube as a tubular section, and a steam reforming catalyst in said shell side; and

10 a catalytic combustion section having a noble metal catalyst dispersed on a supporting material and surrounding the steam reforming catalyst;

wherein said at least one palladium membrane tube has one sealed end located [[at]] upstream of a flowing path.

15 2. (currently amended) The shell and tube reactor module according to claim 1, wherein said palladium membrane tube is formed by mounting a palladium membrane on a porous support, wherein said palladium membrane is made of [[one]] a material selected from [[a]] the group consisting of palladium, a palladium-silver alloy and a palladium-copper alloy.

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3. (original) The shell and tube reactor module according to claim 2 wherein said porous support is made of stainless steel.

25 4. (original) The shell and tube reactor module according to claim 1, wherein a length of said at least one tube is between 3 cm and 120 cm.

Claims 5-6: (Cancelled)

7. (original) The shell and tube reactor module according to claim 1, wherein said stem reforming catalyst is one of $\text{CuOZnOA1}_2\text{O}_3$, $\text{PdOCuOZnOA1}_2\text{O}_3$ and $\text{K}_2\text{O}, \text{NiO}/\gamma\text{-Al}_2\text{O}_3$.

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8. (Cancelled)

9. (currently amended) The shell and tube reactor module according to claim ~~[[8]]~~ 1, wherein said catalytic combustion section is made of a stainless steel.

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10. (currently amended) The shell and tube reactor module according to claim ~~[[8]]~~ 1, wherein said noble metal is selected from ~~[[a]]~~ the group consisting of platinum (Pt), palladium (Pd), rhodium (Rh), Ruthenium (Ru) and a mixture thereof.

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11. (currently amended) The shell and tube reactor module according to claim ~~[[8]]~~ 1, wherein said supporting material is one selected from ~~[[a]]~~ the group consisting of γ -alumina, titania, zirconia, silica, ~~DASH220 (NE Chemtec, Inc. Japan) and N220 (Süd Chemie Catalysts, Japan, Inc.)~~ and alumina deposited with platinum.

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12. (original) The shell and tube reactor module according to claim 1, further comprising a reservoir containing fuels without H_2O provided for starting up heating.

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13. (currently amended) An assembly of shell and tube reactor modules for hydrogen production, comprising a reactor ~~splitting into~~ having two reactor sections and having a common shell, wherein each of said reactor sections has at least one palladium membrane tube as a tubular section~~[[,]]~~ and a steam reforming catalyst~~[[,]]~~; and

a catalytic combustion section having a noble metal catalyst dispersed on a supporting material and surrounding the steam reforming catalyst;

wherein said at least one palladium membrane tube has one sealed end located [[at]] upstream of a flowing path.

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14. (original) The assembly of shell and tube reactor modules according to claim 13, wherein said palladium membrane tube is formed by mounting a palladium membrane on a porous support.

10 15. (original) The assembly of shell and tube reactor modules according to claim 14, wherein said porous support is made of stainless steel.

16. (original) The assembly of shell and tube reactor modules according to claim 13, wherein a length of said at least one tube is between 3 cm and 60 cm.

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Claims 17-18: (Cancelled)

19. (original) The assembly of shell and tube reactor modules according to claim 13, wherein said steam reforming catalyst is one of $\text{CuOZnOA1}_2\text{O}_3$, $\text{PdOCuOZnOA1}_2\text{O}_3$
20 and $\text{K}_2\text{O}, \text{NiO}/\gamma\text{Al}_2\text{O}_3$.

20. (Cancelled)

21. (currently amended) The assembly of shell and tube reactor modules according
25 to claim [[20]] 13, wherein said catalytic combustion section is formed of stainless steel.

22. (currently amended) The assembly of shell and tube reactor modules according to claim [[20]] 13, wherein said noble metal is selected from [[a]] the group consisting of platinum (Pt), palladium (Pd), rhodium (Rh), Ruthenium (Ru) and a mixture thereof.

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23. (currently amended) The assembly of shell and tube reactor modules according to claim [[20]] 13, wherein said supporting material is one selected from [[a]] the group consisting of γ -alumina, titania, zirconia, silica, ~~DASH220 (NE Chemtec, Inc. Japan)~~ and ~~N220 (Süd Chemie Catalysts, Japan, Inc.)~~ and alumina deposited with platinum.

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Claims 24-34: (Cancelled)